Claims:

1.   A method of formatting a block of user data, said method comprising:

effectively arranging said block of user data into an array of bytes, said array comprising a plurality of rows and a plurality of columns of said bytes; and

applying an error correction code to individual ones of said rows of bytes, such that said error correction coded rows each comprise four code words.

2.   The method as claimed in claim 1, further comprising:

in each of said error correction coded rows, interleaving said four code words of the particular row, such that each code word extends substantially along the entire length of said row.

3.   The method as claimed in claim 1, further comprising:

in each of said error correction coded rows, interleaving said four code words of the particular row, such that each code word extends substantially along the entire length of said row; and

such that in each row, a first code word, a second code word, a third code word, and a fourth code word are interleaved in an order of a byte of said first code word, a

byte of said second code word, a byte of said third code word and a byte of said fourth code word, said interleaved order repeating along said row.

4.   The method as claimed in claim 1, wherein each of said rows comprises 128 bytes.

5.   The method as claimed in claim 4, wherein each said columns comprises 124 bytes.

6.   The method as claimed in claim 1, wherein each said columns comprises 124 bytes.

7.   The method as claimed in claim 1, wherein each said column comprises a pair of code words.

8.   The method as claimed in claim 1, wherein each said column comprises a pair of interleaved code words.

9.   The method as claimed in claim 1, wherein:

each said row comprises four C2 code words; and

each said column comprises two C1 code words.

10.   The method as claimed in claim 1 wherein each of said error correction coded rows consists of said four code words of the particular row.

11.   A method of writing data to a linear tape data storage medium, said method comprising;

arranging a block of user data into a data group of a logical array of data bytes, the array effectively comprising a plurality of rows of said data bytes and a plurality of columns of said data bytes;

applying error correction coding to individual ones of said rows, such that each of said rows is each arranged into four code words;

writing said data group as a data track extending across the width of said tape data storage medium such that all of said data group is contained within said single data track extending across said width of said tape data storage medium.

12.   The method as claimed in claim 11, wherein each of said data group comprises 448 C2 code words.

13.   The method as claimed in claim 11 further comprising:

applying error correction coding to columns of said data group such that each of said column comprises 2 code words.

14.   The method as claimed in claim 11, wherein said data group comprises 256 C1 code words.

15.   The method as claimed in claim 11, wherein said data track has a width in the range 5.4µm, plus or minus 0.1µm.

16.   The method as claimed in claim 11, wherein said data are written to tape at a bit density in the range 6,220 to 6,614 bits/mm.

17.   Data processing apparatus for arranging data into a format for writing to a data storage medium, said apparatus comprising:

a memory for storing a data group comprising a plurality of bytes of user data effectively arranged in an array including columns and rows;

an error correction coding device for applying an error correction code to individual rows of said array, the code being such that each said individual row is coded into four code words; and

a write head for writing each of said data groups across the width of a tape data storage medium, such that each said data group is written along a corresponding single track extending across the width of said tape data storage medium, and transverse to the main length of said tape data storage medium.

18. A data processing device for arranging data into a format of an array of bytes arranged in rows and columns, said device comprising:

a memory for storing a logical array comprising a plurality of bytes of user data effectively arranged logically in a plurality of rows and a plurality of columns; and

an error correction coding device for applying an error correction code to individual ones of said rows of bytes, such that said individual rows are each coded into four code words.

19. The data processing device as claimed in claim 18, wherein:

said error correction coding device is operable for applying an error correction code to each said column of bytes, such that each said column is coded into two code words.

20. The data processing device as claimed in claim 18, wherein:

said error correction coding device is operable for coding individual ones of said rows of bytes into four interleaved code words effectively extending substantially along a whole length of one of said rows.

21. A method of writing data to a linear tape data storage medium, said method comprising;

arranging a block of user data into a logical group of data bytes, effectively comprising a plurality of rows of said data bytes and a plurality of columns of said data bytes;

applying an error correction code to said data group such that each of said columns of said data group is coded with two C1 code words;

applying an error correction code to individual ones of said rows, such that each of said individual rows is arranged into four C2 code words; and

writing said data group in a single data track across the width of said tape data storage medium, such that all of said data group is located within said single data track extending across said width of said tape data storage medium.

22. A tape data storage system comprising:

at least one write head for writing data to a magnetic tape data storage medium;

a transport mechanism for transporting said tape data storage medium past said write head;

a logical formatting device for formatting data into a data group comprising an array of bytes of data effectively logically arranged in a plurality of rows and a plurality of columns;

a memory for storing said logical array of data; and

an error correction coder for applying an error correction code to individual ones of said rows of bytes, such that said individual rows are each coded into four code words.

23.   The data storage system as claimed in claim 22, wherein said at least one write head is arranged to write a plurality of said arrays of data to a corresponding respective plurality of data tracks, each of which, when written, extends diagonally across the width of said tape data storage medium, each of said data tracks including all the bytes of and corresponding with the bytes of one of said arrays; with a corresponding respective said array.

24.   The data storage system as claimed in claim 22, in combination with a tape data storage medium comprising a band of elongated tape having:

a width in the range 3.81 mm plus or minus 0.01 mm; and

a length in the range 170m plus or minus 5m.

25. A metal particle type tape data storage media cartridge comprising a band of elongate tape having:

a width in the range 3.81 mm plus or minus 0.01 mm; and

a length in the range 170m plus or minus 5m.

26. The tape data storage media cartridge as claimed in claim 25, having a thickness in the range 5.3µm plus or minus 0.02µm.

27. A method of formatting a block of user data, said method comprising:

effectively arranging said block of user data into an array of bytes, said array comprising a plurality of rows and a plurality of columns of said bytes; and

applying an error correction code to individual ones of said rows of bytes, such that said error correction coded rows each comprise four code words,

each of said row comprising 12 bytes, each of said columns comprising 124 bytes.

28. A method of writing data to a linear tape data storage medium, said method comprising;

arranging a block of user data into a data group of a logical array of data bytes, the array effectively comprising a plurality of rows of said data bytes and a plurality of columns of said data bytes;

applying error correction coding to individual ones of said rows, such that each of said rows is each arranged into four code words;

writing said data group as a data track extending across the width of said tape data storage medium such that all of said data group is contained within said single data track extending across said width of said tape data storage medium,

each of said data groups comprising 448 C2 code words.

29.   A method of formatting a block of user data, said method consisting of:

effectively arranging said block of user data into an array of bytes, said array consisting of a plurality of rows and a plurality of columns of said bytes; and

applying an error correction code to individual ones of said rows of bytes, such that said error correction coded rows each comprise four code words,

each of said rows consisting of 128 bytes, each of said columns comprising 124 bytes.

30.   A method of writing data to a linear tape data storage medium, said method consisting of;

arranging a block of user data into a data group of a logical array of data bytes, the array effectively consisting a plurality of rows of said data bytes and a plurality of columns of said data bytes;

applying error correction coding to individual ones of said rows, such that each of said rows is each arranged into four code words;

writing said data group as a data track extending across the width of said tape data storage medium such that all of said data group is contained within said single data track extending across said width of said tape data storage medium,

each of said data groups consisting of 448 C2 code words.

31.   A storage medium comprising a plurality of tracks storing data, each of said tracks including M sequential fragments, each of said fragments including N sequential bytes, each of said bytes including P sequential bits, the M sequential fragments including N sets of interleaved bytes, each of said N sets of interleaved bytes including four interleaved C2 code words from the M sequential fragments.

32.   The storage medium of claim 31 wherein each of said fragments includes two interleaved sequential C1 code words.

33. The storage medium of claim 31 wherein each of said tracks has M and only M sequential fragments, and each of said fragments consists of the N sequential bytes.

34. The storage medium of claim 33 wherein M = 128 and N = 124.

35. The storage medium of claim 34 wherein the medium is an elongated magnetic tape and the tracks are diagonal tracks on the tape.

36. The storage medium of claim 31 wherein the medium is an elongated magnetic tape and the tracks are diagonal tracks on the tape.

37. A storage medium comprising a plurality of tracks storing data, each of said tracks including sequential fragments 0, 1, 2, 3...j...M, each of said fragments including 1, 2...k... N sequential bytes, where j is each of 1, 2... M and k is each of 1, 2... N, each of said bytes including P sequential bits, each of the fragments including two interleaved C1 code words, the fragments being arranged so that bytes 0 of fragments (j-3), (j-2), (j-1), j respectively store bytes of four interleaved first C2 code words; byte 1 of fragments (j-3), (j-2), (j-1), j respectively store bytes of four interleaved second C2 code words; and bytes k of fragments (j-3), (j-2), (j-1), j respectively store bytes of four interleaved k C2 code words.

38.   The storage medium of claim 37 wherein each of said fragments consists of two interleaved sequential C1 code words, each of said tracks has M and only M sequential fragments, each of said fragments consists of the N sequential bytes, the M sequential fragments consist of the Q sequential sets of bytes.

39.   The storage medium of claim 38 wherein M = 128 and N = 124.

40.   The storage medium of claim 39 wherein the medium is an elongated magnetic tape and the tracks are diagonal tracks on the tape.

41.   The storage medium of claim 37 wherein the medium is an elongated magnetic tape and the tracks are diagonal tracks on the tape.